



Original article

Perceptions of oral health adequacy and access in Michigan nursing facilities

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Objective: To determine practices and perceived access barriers (facility resources, attitudes and professional dental involvement) related to oral health by surveying directors of nursing (DONs) in Michigan nursing homes (NHs).

Background: DONs are crucial to NH practice and policy, so understanding their perceptions of oral health care is vital.

Methods: A 27-item questionnaire exploring aspects of oral health was mailed to all 402 Michigan NH. Descriptive statistics were calculated for response items.

Results: Facility response rate was 32% ($n = 129$). Sixty-three per cent of facilities had a written dental care plan primarily co-ordinated by nursing staff and social workers. Stationary dental equipment was available in 3% of facilities. Thirty-eight per cent stated an examination by a dentist was provided to new residents. Seventy-five per cent of residents identified as needing dental treatment were likely to receive it. Of the 28% of residents receiving dental treatment beyond an examination in the past year, 28% received emergent care. Over 50% of responding DONs indicated satisfaction with how oral hygiene needs were met in their facilities. The greatest perceived barriers were willingness of general and specialty dentists to treat residents at the nursing facility and/or their private offices as well as financial concerns of the resident and/or family. Generally, greater resources were available in urban facilities, but substantial barriers to care were uniformly perceived.

Conclusion: Oral health policies and practices within Michigan NH vary, as measured by resources, attitudes, and the availability of professional care. Dental involvement in policy creation, provision of consultation, and service is limited.

Keywords: geriatric dentistry, oral health, nursing homes, barriers, survey.

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Introduction

About 35.9 million people, 12% of the US population, are 65 years or older, 1.5 million Americans reside in nursing facilities, equivalent to approximately 41 per 1,000 population in the 65+ age group¹. Projections estimate that by 2030, the 65+ population will exceed 72 million (US Census)². As the number of older adults in the population increases, the number living in nursing facilities can be expected to increase as well.

Literature has described the compelling oral health needs of nursing home (NH) residents.

Older adults living in nursing facilities tend to be at great risk for tooth loss, periodontal disease and attachment loss, caries, periapical pathology, soft tissue lesions, alveolar ridge resorption, and ill-fitting or missing dentures³⁻⁹. The impact of compromised oral health in the NH population is far from trivial with effects including diminished quality of life, impaired function and the potential for increased morbidity and mortality. The oral cavity can be a portal of entry for microbial infections that may result in severe, even life-threatening consequences, such as aspiration pneumonia¹⁰.

Dolan and Atchison¹¹ described the frail and functionally dependent elders as having significant dental needs and experiencing greater barriers to receiving dental care than independent elders. Dental utilisation research highlights these barriers, reporting only one in five residents having had a dental visit in the last year¹², with a mean time of 4.9 years since the last visit¹³. Key decision makers in long-term care facilities, such as directors of nursing (DONs), play a critical role in the development and implementation of resident care policy, including oral health care. Surveys in the United States and other countries have provided insights into how administrator and carer attitudes and perceptions may influence oral health care in their facilities. Low regard for the importance of oral health and its relationship to overall health was identified as a barrier to oral health promotion efforts in Switzerland and Australia^{14,15}. A survey of Ohio NH executive directors revealed a discrepancy between perceived levels of oral health and satisfaction with oral care: 53% rated their residents' oral health as fair or poor but were still satisfied with the oral care provided at their facilities¹⁶. Similar inconsistencies were found by Berkey, *et al.*¹⁷ who reported that a majority of DONs in a nine-state study, were satisfied with their facility's ability to meet the oral health needs of residents, in spite of reporting levels of access significantly below that expected by dental professionals. In a survey of DONs in Nebraska, Johnson *et al.*¹⁸ found that only 36% of NHs had onsite dental services.

The goal of this paper was to report the results of a census survey of DONs in Michigan NHs regarding the status of oral health care in their facilities and barriers to improvement.

Methods

A listing of all licensed NHs in the State of Michigan was obtained from Michigan Master Data Archive at the University of Michigan (UM) Institute of Gerontology. Sufficient resources were available for the cross-sectional census survey of all 402 facilities using questionnaires mailed to the DONs. This (UM) IRB-approved study was funded by a UM Geriatrics Center grant through the Claude Pepper Older Americans Independence Center.

Survey instrument

The questionnaire was modified from a multi-state instrument developed and validated at the University of Colorado. The four-page questionnaire consisted of 27 close-ended items and explored

different aspects of oral health. In addition to demographics, the survey addressed facility oral health barriers, resources, policies and procedures, and DONs' knowledge and perceptions.

Study design

Pilot testing and refinement of the survey instrument was achieved through input from selected NH administrators. One week prior to the questionnaire mailing, a postcard was sent advising facilities of the nature of the upcoming study. In addition to the four-page questionnaire, the mailed packet included (i) a cover letter from the UM researchers, (ii) a letter of support from the Michigan Association of Homes and Services for the Aging, and (iii) a stamped return envelope. A reminder postcard was sent 1 week after the questionnaire. Efforts were made to ascertain the existence and correct address of NHs for which the mailings were returned from the post office due to incorrect or non-existent addresses. Additional questionnaires were sent as appropriate for these facilities or when NHs requested replacement of misplaced forms.

Data management and analysis

Data collection took place between November 2005 and January 2006. To ensure anonymity, all returned questionnaires were assigned an identification number. Data from returned surveys were double-entered into a Microsoft Office Access 2003 database software (Microsoft Corporation, Redmond, WA, USA). Discrepancies from the double entry were corrected and where possible, data were further cleaned by resolving inconsistencies in responses. Data were analysed with Statistical Analysis Software (Version 9.1; SAS Institute Inc., Cary, NC, USA). Descriptive statistics were generated to characterise the population of NH in the state of Michigan. Respondent estimates were used to calculate overall mean percentages where applicable.

This article presents univariate and bivariate distributions of results for categorical and continuous response items in the questionnaire. Many comparisons by urbanicity are included. The urbanicity variable used for comparison was based on Rural Urban Commuting Area (RUCA) codes. For these comparisons a dichotomous variable was used: 'Metropolitan' ($\geq 50\ 000$) and 'Micropolitan' (10 000–49 999) RUCA categories represented urban areas, and 'Small Town' (2500–9999) and 'Rural' (commuting flow not to an Urbanised Area or Urban Cluster) RUCA categories represented rural areas.

With questionnaires sent to all NH in the state, this project represents a point in time census study of Michigan nursing facilities. Furthermore, Michigan NHs represent a unique population of facilities. Therefore, the responding facilities cannot be interpreted as representing a random sample of NH from a larger population of such facilities, e.g. in other states or nationally. The presentation of the descriptive analysis is based on the theoretical statistical argument that the estimates and differences presented for our target population at the point in time that the survey was conducted are not subject to sampling error. Therefore, statistical precision estimates and tests of differences, which are based on the assumption of sampling error associated with random sampling from a population, are not included.

There is possible error in the results because of measurement error and non-response bias. The presence and extent of effects of non-response bias and measurement error are evaluated to the extent

possible with available information and data. Comparisons of the responding NHs to NHs in the state and nationally have been included to assess the potential for non-response bias.

Results

Completed questionnaires were returned by 129 of the 402 surveyed facilities, a 32% return rate (Table 1). Based on the reported average facility census from responding facilities and available state data, the responding NHs represented about 12 797 (30.2%) of the approximately 42 400 total NH residents in the state. Seventy-one per cent of the questionnaires were completed by the targeted personnel group, DONs. Characteristics of the respondent nursing facilities are reported in Table 1. Differences between facilities in urban and rural locations were found in mean facility bed size, mean daily census, percentage of private pay residents, ethnic distribution, percentage of facilities in multi-

Table 1 Characteristics of respondent nursing facilities in the state of Michigan census survey with comparable state of Michigan and United States characteristics.

	Survey results			Michigan	United States ^a
	Overall	Urban ^b	Rural ^b		
Michigan NH/Surveys mailed, <i>n</i>	402	314	88	402	18 000
Surveys received (%)	129 (32)	89 (74)	32 (26)	Urban: 78% Rural: 22%	Metropolitan statistical area: 61% Nonmetropolitan statistical area: 39%
Response rate	32%	28%	36%		
Facility Size (no. beds), mean ± SD	107 ± 54	114 ± 56	86 ± 40	114	105
Daily census (no. beds), mean ± SD	99 ± 50	105 ± 53	80 ± 37		
Funding/payer source: % private pay, mean ± SD	13 ± 15	16 ± 16	8 ± 9		
Status					
For-profit/proprietary, %	46	45	44	66	67
Ethnicity: % Caucasian, mean ± SD	88 ± 20	86 ± 21	96 ± 10	79	88
Organisation					
Multiple facilities, %	49	52	42		60
No. facilities, mean ± SD	19 ± 30	18 ± 35	21 ± 19		
Dental insurance part of employee employment benefits, %	84	86	77		
Person completing survey					
Director of Nursing, <i>n</i> (%)	90 (71)	62 (70)	23 (72)		
Social worker, <i>n</i> (%)	21 (16)	14 (16)	6 (18)		
Administrator, <i>n</i> (%)	5 (4)	4 (5)	1 (3)		
Other ^c , <i>n</i> (%)	11 (9)	8 (9)	2 (6)		

^aJones²⁷.

^bEight facilities did not report or had invalid zip codes. These could not be identified as urban or rural.

^cOther titles/roles: Admissions; Office Manager; Customer Service; Inservice Co-ordinator; Director of Clinical Services; Care Co-ordinator.

ple-facility organisations, and number of facilities offering dental insurance employment benefits.

Table 2 characterises the policy and personnel that provide care planning and assess resident oral health. Most of the facilities (63%) had a written dental care plan and these were more often reported in rural facilities than urban (73% vs. 58%). Dental professionals had assisted in the development of the written care plans in only 16% of the facilities having written plans of care. The positions primarily responsible for co-ordinating the plan of care were social workers and unit charge nurses.

The availability of oral health resources used for resident care is summarised in Table 3. Overall, 73% of the respondents reported provision of dental treatment within their facilities with 70% of care delivered using portable equipment brought into the facilities by dental providers. Urban areas were more

Table 2 Policy and personnel responsible for oral health of residents.

	<i>State of Michigan</i>		
	<i>Overall</i>	<i>Urban</i>	<i>Rural</i>
Facility's plan of care for oral health			
Percentage of facilities with written plan	63	58	73
Percentage of written plans drafted with dental professional assistance	16	16	14
Primary responsibility for day-to-day co-ordination of dental plan of care (%)			
Social worker	44	45	38
Unit charge nurse	16	14	22
Facility administrator/administration	13	14	9
Other nurse	13	15	12
Director of nursing	12	10	19
Dentist	2	2	0
Person typically performing MDS* assessment of 'oral/nutritional status' (%)			
Other nurse	50	52	41
Dietician	43	41	53
Unit charge nurse	5	3	6
Director of nursing	2	1	3
Person typically performing MDS* assessment of 'oral/dental status' (%)			
Other nurse	58	60	47
Dietician	35	36	41
Unit charge nurse	5	3	9
Director of nursing	2	1	3

*Minimum Data Set.

likely to have in-house dental treatment than their rural counterparts (84% vs. 34%). Forty-one per cent of urban facilities and 30% of facilities located in rural areas reported that new residents would be examined by a dentist upon admission to the facility. Over one half of the longer stay residents (1 year or more) were considered likely to receive an annual oral examination by a dental professional (59% in urban vs. 41% in rural locations). Among the reported 80% of residents requiring assistance with oral care, an average of 11 min of supervision or assistance with personal oral hygiene activities were reported to be provided.

Responses to identified need for dental care and the types of treatment provided are summarised in Table 4. Survey participants indicated that 75% of residents who were identified as needing dental care by a dentist or dental hygienist would actually receive treatment. Only 28% of all residents were likely to have received dental treatment beyond an examination in the past year. Emergency dental care accounted for approximately a quarter of the care provided.

A hypothetical resident experiencing acute dental discomfort, due to an abscessed tooth or gums, was the object of three questions that sought to identify facility response to a resident with oral pain. The majority of the respondents (85%) felt that the individual would not receive care within 24 h from the identification of the problem. Over three quarters believed that a general dentist would be the most likely professional to provide treatment. Dissatisfaction with the facility response to this hypothetical resident's oral pain was indicated by only 27% of survey participants.

Satisfaction with other aspects of oral health care practices in the facilities surveyed is summarised in Table 5. Over half expressed being satisfied ('very' or 'somewhat') with the way that oral hygiene needs were met at NH facility. Satisfaction with the quality of dental treatment provided by dental professionals at their facilities was high, with 75% of respondents indicating being either 'very' or 'somewhat' satisfied.

A series of 14 potential barriers to good oral health were listed. Respondents were asked to scale the significance of barriers from '0' not significant to '5' highly significant. Table 6 provides percentages of respondents who ranked the barriers to care as 3 or greater. The greatest barriers perceived by respondents were willingness of general dentists and specialty dentists to treat residents at the nursing facility and private office, as well as financial concerns of the resident and/or family. Items not considered significant barriers included

Table 3 Oral health resources provided for residents.

	<i>State of Michigan</i>		
	<i>Overall</i>	<i>Urban</i>	<i>Rural</i>
Type of dental equipment utilised for resident care (%)			
Dental treatment provided at facility	73	84	34
Portable dental equipment	70	82	31
Stationary/built-in dental equipment	3	2	3
Beyond MDS assessment, per cent of facilities providing new residents a more detailed screening or examination by a dentist (%)	38	41	30
Percentage of those in residence for one or more years who are likely to receive an annual oral examination by a dental professional, mean \pm SD	55 \pm 35	59 \pm 33	41 \pm 37
Oral health most likely to be monitored by (%)			
Visual assessment by a staff member	44	41	44
Screening examination by a dentist or dental hygienist	18	23	9
Verbal query of resident by a staff member	38	36	47
Percentage of residents who required supervision or assistance with personal oral hygiene activities during past seven days, mean \pm SD	80 \pm 17	81 \pm 17	79 \pm 18
Average number of staff member minutes per resident spent providing supervision or assistance on a given day, mean \pm SD	11 \pm 7	10 \pm 7	11 \pm 8

Table 4 Dental treatment provided for residents.

	<i>State of Michigan</i>		
	<i>Overall</i>	<i>Urban</i>	<i>Rural</i>
Percentage of residents identified as needing dental care who are likely to receive treatment, mean \pm SD	75 \pm 31	77 \pm 29	64 \pm 36
Percentage of all residents in facility who received dental treatment beyond an examination in past 12 months, mean \pm SD	28 \pm 24	30 \pm 25	19 \pm 14
Percentage of dental care that was considered:			
Emergency, mean \pm SD	28 \pm 36	26 \pm 34	38 \pm 42
Routine, mean \pm SD	65 \pm 36	70 \pm 33	48 \pm 38
When would a hypothetical resident with acute dental discomfort most likely be treated by a dentist? (%)			
Immediately	3	1	9
Within 24 h	12	15	6
Within 1–3 days	38	36	47
Within 4–7 days	25	25	22
Longer than 7 days	18	19	9
Dentist would not typically be involved	4	3	6
If the hypothetical resident were treated outside the facility, what is the most likely treatment setting? (%)			
General dentist's private office	77	75	84
Specialist dentist's private office	13	14	9
Hospital emergency department	10	11	6
Are you satisfied with the way your facility would probably help with the hypothetical resident? (%)			
Very satisfied	28	29	29
Somewhat satisfied	45	44	45
Somewhat dissatisfied	21	22	16
Very dissatisfied	6	4	10

lack of interest in dental care by resident or resident's family, and apathy of dental consultants, facility administrators or staff.

Discussion

The presence of a policy, the availability and commitment of resources, and the knowledge and

Table 5 Administrator knowledge and perceptions.

	State of Michigan		
	Overall	Urban	Rural
Prompt treatment of resident dental problems would prevent serious illness (%)			
Definitely yes	49	49	53
Probably yes	44	44	41
Probably no	7	7	6
Definitely no	0	0	0
Satisfaction with the way the oral hygiene needs of resident are met at the facility (%)			
Very satisfied	9	9	9
Somewhat satisfied	48	51	44
Somewhat dissatisfied	35	31	41
Very dissatisfied	8	9	6
Satisfaction with the quality of dental treatment provided by dental professionals at the facility (%)			
Very satisfied	26	20	38
Somewhat satisfied	49	52	44
Somewhat dissatisfied	19	24	9
Very dissatisfied	5	5	9

perceptions of decision makers are important elements for addressing the oral health needs of the NH population; however, professional dental involvement is also essential. The results of this survey demonstrate that professional dental involvement in long-term care is limited and varies by locale. Facility plans of care for oral health are being developed largely without the input of the dental profession. Dental professionals do not evaluate resident oral status on admission, nor are such examinations ever occurring in 60% of responding facilities.

Upon admission to a long-term care facility and at regular intervals thereafter, NH residents receive a comprehensive assessment that employs the Minimum Data Set (MDS). The use of this assessment tool is mandated by the federal government (OBRA 1987)¹⁹ for all facilities that receive either Medicaid or Medicare reimbursement. Two sections of the MDS specifically address oral health issues such as chewing or swallowing problems, mouth pain, oral cleanliness, condition of gum tissue, etc. Results from this survey indicate that nursing personnel and dieticians primarily perform the oral-related portions of the MDS. The inadequacy of the MDS to accurately identify oral health problems has been described by Thai *et al.*²⁰ who found that nurses' MDS assessments identified few oral health problems and those problems identified did not translate into dental treatment. Ettinger *et al.*²¹ reported that only 9% of DONs in Iowa found the MDS useful in identification of dental

Table 6 Perceived barriers to oral health for residents ($n = 129$).

Barrier	Overall (%) ^a	Urban (%) ^a	Rural (%) ^a
Willingness of specialty dentist (like an oral surgeon or denture specialist) to treat residents at nursing facility	91	88	100
Financial concerns of resident or family	77	79	77
Willingness of specialty dentist (like an oral surgeon or denture specialist) to treat residents at private office	72	75	72
Willingness of general dentist to treat residents at private office	68	70	66
Willingness of general dentist to treat residents at nursing facility	59	55	74
Availability of suitable dental treatment space	54	53	63
Availability of suitable treatment equipment	52	50	59
Transporting resident to dentist or hygienist	49	49	55
Time constraints on nursing facility staff	48	49	56
Lack of interest in dental care by resident	44	44	45
Lack of interest in dental care by resident's family	43	47	37
Apathy of dental consultant	35	38	33
Apathy of nursing facility staff	15	13	19
Apathy of nursing facility administration	8	7	9
Other ($n = 24$) ^b	71	69	83

^bDentists who accept Medicaid ($n = 10$).

^aPercentage of respondents who ranked the barrier as 3 or greater.

needs. In the absence of dentally trained individuals, oral assessment are likely inadequate at identifying oral health needs.

When questioned whether residents identified as needing dental care were likely to receive it, responses indicated that most (75%) would. Furthermore, the consequences of delayed treatment were well understood with 93% indicating that prompt treatment would definitely or probably prevent serious illness. Yet, when asked about the likely time lapse before treatment would be initiated for a hypothetical resident with acute dental discomfort, only 15% indicated that care would commence within 24 h. Nearly half of respondents thought four or more days would pass before treatment was provided. A small percentage (4%) indicated that a dentist would not typically be involved in care at all.

This dichotomy between the perceived importance of responding to oral disease and lengthy periods elapsing before treatment would be provided is puzzling. It may be that the consequences of neglected oral care are acknowledged but not considered as dire. Conversely, the seriousness of the situation may be well understood but the ability of the dental community to respond in a timely fashion may result in unacceptable delays. The second explanation is supported by the majority indicating that this hypothetical resident with acute dental discomfort would be treated in the general dentist's private office, which was identified as a potential barrier to resident oral health by 68% of responding facilities. However, this explanation is not supported by the nearly 70% of respondents indicating satisfaction with their facility's response. Treatment of acute dental discomfort within 24 h is the standard of care in the dental profession. Therefore, the dental and nursing facility professionals appear to have different standards of acceptable response time to the treatment of dental pain. A disparity in the availability of care is also apparent when examining the number of residents receiving dental treatment beyond an examination within the past year. The national average for dental visits by non-institutionalised adults 65 years and older is 56%²². By comparison, survey results indicate that only 28% of nursing facility residents receive dental treatment beyond an examination with nearly one-third of visits considered emergency care. Within facilities, the majority (82%) of oral health monitoring is the responsibility of staff, through either visual assessment or verbal query of the resident. Lack of training in the identification of oral disease by staff²³ and the inability of many NH residents to

articulate their own needs because of cognitive impairment²⁴ brings the adequacy of this type of monitoring, including the evaluation of resident oral hygiene, into question.

A two-part question first assessed the percentage of residents requiring 'supervision or assistance with personal oral hygiene'. Facilities reported that assistance or supervision of personal oral hygiene activities was required for 80% of residents, corresponding with national findings that 91% of NH residents receive personal care services during their stay²⁴. The second part of the question queried the number of minutes spent daily 'providing supervision/assistance', with a result of a mean of 11 min. Because the second part of the question did not specifically state 'oral hygiene' assistance, this question was likely interpreted more generally as responses ranged from 0 to 30 min. Thirty minutes of daily assistance just for oral hygiene is highly suspect. Coleman and Watson²⁵ reported results of an observational study of morning cares performed in five New York NHs. Routine morning care included dressing, bathing, transfer, toileting, changing incontinence products, oral hygiene and grooming. On average, the time observed that was spent on oral care was between 1 and 5 min and was provided for only 16% of residents²⁵. Satisfaction with the way the oral hygiene needs of the residents are met was slightly more positive than negative (57% satisfied vs. 43% dissatisfied) which would not be the case if residents on average were receiving 11 min personal oral hygiene assistance.

Directors of nursing identify the lack of willingness of dentists to provide care within their facilities or in private practice as the greatest barrier to the improved oral health status of their residents. Responsibility for day-to-day co-ordination of the dental care plan is often taken by social workers (44%) and includes arranging for dental care. This task is difficult given the lack of willingness of dental specialists to treat residents at the NH, the lack of willingness of either general dentists or specialists to treat nursing facility patients in their private office, and the limited number of dentists who accept Medicaid.

This survey demonstrates that a delivery system able to effectively provide dental care to institutionalised elderly in Michigan is lacking. Helgeson, *et al.*²⁶ identified a number of barriers that prevent the profession from providing adequate care. Among them are inadequate facilities and equipment, lack of properly trained oral health providers, lack of integration of oral health care into medical care, and lack of financial resources. In this survey, DONs indicate that the lack of professional

dental involvement in the identification and treatment of oral disease within the NH population is the greatest barrier to improved oral health. The population of NH residents will continue to grow in absolute number due to the ageing of the 78 million 'baby boomers'. Orally, what will differentiate this group from previous cohorts is that they will have had the advantages of better access to dental care, exposure to fluorides and more aggressive preventive care. In short, they will have more teeth and higher expectations (and need) for access to dental care. The inadequacy of the current system can only become more severe in the future unless changes occur.

The 32% response rate achieved in this survey parallels the response rate obtained by Pyle *et al.*¹⁶ in a recent survey of NH executive directors in Ohio (33.2%). However, higher response rates have been achieved by Johnson and Lange¹⁸ in Nebraska (64%) and by Chung *et al.*¹⁴ in a survey of managers of Swiss NHs in Geneva (69%).

Response to the survey was limited despite the use of postcards sent prior to the mailing and as a reminder. The use of a smaller sample with incentives for completion may have yielded a better response rate. The timing of the mailings, near the holiday season, may have negatively impacted survey returns. A shorter, simpler questionnaire would probably have yielded a better return but would have limited the information derived and comparability to data from other surveys. Whether the low response rate reflects a low priority for resident oral health, lack of time or survey overload is unknown.

This was a census study in that all licensed NHs in the state were mailed surveys. Likewise, the Michigan NHs cannot be considered as a random sample in a statistical sense of NHs of the nation. Therefore, statistical tests and precision estimates based on error associated with drawing a random sample from a population can be argued to be inappropriate.

In this study, the primary issue to address is potential non-response bias. With lower response rate comes increased potential for non-response bias, raising the concern that survey responders are not representative of nursing facilities in Michigan. The possible presence of non-response bias can be indicated by assessing available information for differences of responding facilities to all NHs in Michigan and the nation.

The characteristics of the responding facilities ($n = 129$) are similar in profile to NHs in the nation in average number of beds (107 vs. 105). The average number of beds in Michigan NHs overall is

114. Ethnicity of the residents matches the national average of 88% Caucasian, which is slightly higher than the average for Michigan NHs (79%). Forty-six per cent of survey respondents were from for-profit facilities, which is lower than the national (67%) and overall state of Michigan (66%) percentages. There are small differences between responders and overall state NH numbers for geographical location, as indicated by zip code related RUCA codes (described in the 'Data management and analysis' section). A slightly higher percentage of responding facilities were rural (26%) compared to state facilities overall (22%). Further RUCA geographical breakdown of facilities were 55% 'metro', 19% 'micro', 14% 'small town' and 12% 'rural' for responding facilities, compared to 65% 'metro', 13% 'micro', 14% 'small town' and 8% 'rural' for Michigan NH overall.

While these comparisons show differences, most are small in magnitude, generally not raising concerns of a large non-response bias problem. The largest difference between survey and state (46% vs. 66%) was in percentage of for-profit facilities. The reason for the lower response rate and the impact of this under-representation of for-profit facilities in our results is unclear. Some possible considerations are that for-profit facilities have a higher percentage of skilled beds with resultant higher turnover. Staff of these facilities with residents whose stays are projected for less than 6 months may not consider oral health as within their purview. In addition, for-profits may have thin staffing margins which may preclude their participation in 'extra' activities such as surveys. Finally, as many for-profits are part of larger corporations, participation in surveys may require clearance by those higher in the corporate chain. If limited staffing is the driving force, then non-response from the for-profit organisations may indicate that oral health concerns are of secondary importance. The impact of this non-response bias would be that survey results would be more positive than the true situation.

Another source of potential non-response bias would be a reluctance to respond based on hesitancy to reveal that the oral health-related activities at the responder's facility were inadequate. However, judging from item response and additional written comments, survey participants perceived and reported inadequacies thereby lessening the concern for this particular source of bias.

Respondent bias may paint a picture that portrays the situation as either better or worse than is actually the case. In this research, respondents may reflect a pool of individuals who were more moti-

vated to address oral health issues than non-responders. Therefore results may actually present a picture that is more positive than that observed if participation was more universal. Resultant values would not represent non-responders or overall population values. However, results echo access issues identified in the most recent National Nursing Home Survey²⁷ and review articles²⁸. In summary, while the potential for non-response bias exists, evaluation and comparison of survey data with available information for non-responding facilities would not indicate the presence of substantial bias.

Any survey instrument is limited by the accuracy of interpretation of terms by the respondents. Further clarification of terminology used in the survey would have added to the overall length, but likely aided in the interpretation. For example, the survey addressed whether a facility had a 'written plan of care' for dental needs. As written, the term could have been interpreted as having a daily oral care plan for individual residents or as having a contractual agreement with a dentist. Both aspects are important but have very different implications for day-to-day attention to oral health vs. episodic treatment events.

Conclusion

Michigan NHs lack uniformity in oral health policies and practices. Survey results highlight marked differences in the availability of resources directed towards oral health maintenance and the availability of dental care. The lack of dental professional involvement in policy creation, consultation, and services needs to be addressed to improve oral health in Michigan nursing facilities.

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